

What is claimed is:

1. An electrical power supply system for an automotive vehicle comprising:

an alternator having an armature winding and a field coil for supplying a power to both a high power load and a battery,

a stepping-up DC/DC converter to step up a voltage of said battery for applying to said field coil,

a voltage control means for controlling an output voltage of said alternator by controlling a current of said field coil, and

a control means for increasing power of said alternator by changing said output voltage of said alternator in response to a rotating speed of said alternator when said alternator supplies power to said high power load, and for controlling said output voltage of said alternator to a battery charging voltage by regulating said voltage control means when said alternator supplies power to said battery.

2. The electrical power supply system for the automotive vehicle according to claim 1, wherein a voltage applied to said field coil is stepped up to a voltage of the battery multiplied by a factor of 1.2 to 2.0.

3. The electrical power supply system for the automotive vehicle according to claim 1, wherein said output voltage of said alternator changing in response to said rotating speed is set to be higher than said voltage of said battery.

4. The electrical power supply system for the automotive vehicle according to claim 1, wherein said output

voltage of said alternator changes in response to said rotating speed detected by a rotating speed detector.

5        5. The electrical power supply system for the automotive vehicle according to claim 1, wherein said field current of said alternator is controlled by a detected temperature of said field coil by a temperature sensing device in said voltage control means .

10        6. The electrical power supply system for the automotive vehicle according to claim 1, wherein said field current of said alternator is controlled by an inferred temperature from said field current of said alternator detected by a current detecting device in said voltage control means .

15        7. The electrical power supply system for the automotive vehicle according to claim 1, wherein said stepping — up DC/DC converter for applying said stepped up voltage of said battery to said field coil is integrated with said voltage control means.

20        8. An electrical power supply system for an automotive vehicle comprising :

an alternator having an armature winding and a field coil for supplying a power to both a high power load and a battery,

25        an alternator having an armature winding and a field coil for supplying a power to both a high power load and a battery.

a stepping — up DC/DC converter to step up a voltage of said battery for applying to said field coil,

a voltage control means for controlling an output

voltage of said alternator by controlling a current of said field coil, and for increasing an output of said alternator by changing said output voltage in response to a rotating speed of said alternator in a predetermined rotating speed zone, and

5           a stepping-down DC/DC converter to step down said output voltage of said alternator to a charging voltage for said battery, and to supply power with a regulated voltage to both said battery and said high power load.

10           9. The electrical power supply system for the automotive vehicle according to claim 8, wherein said stepping down DC/DC converter for supplying said power to both said high power load and said battery is integrated with said voltage control means.

15           10. The electrical power supply system for the automotive vehicle according to claim 8, wherein an output voltage of said stepping-down DC/DC converter has negative gradient temperature characteristics.